Docket No.: 1185.1055

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of:

Fuminori HIRAISHI

Serial No. 09/726,329 Group Art Unit: 2871

Confirmation No. 1030

Filed: December 01, 2000 Examiner: Dung T. Nguyen

For: LIGHT CRYSTAL DISPLAY, SURFACE LIGHT SOURCE DEVICE, AND LIQUID CONTROL SHEET

APPEAL BRIEF

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

I. Real Party in Interest

The inventor Fuminori HIRAISHI assigned all rights in the subject application to ENPLAS CORPORATION according to the Assignment executed November 10, 2000 and submitted for recordation on November 30, 2000 which is recorded at Reel 11323, Frames 408-409. Therefore, the real party in interest is ENPLAS CORPORATION.

II. Related Appeals and Interferences

There are no related appeals or interferences known to Appellants, Appellants' legal representatives or the Assignee, ENPLAS CORPORATION, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1-6 are pending in the application; claims 1-6 stand rejected under the first and second paragraphs of 35 USC §112 and under 35 USC § 102(b) and claims 1-6 are being appealed.

IV. Status of Amendments

No Amendment was filed in response to the December 13, 2006 Office Action.

V. Summary of Claimed Subject Matter

Claim 1

Claim 1 recites a "liquid crystal display" (claim 1, line 1) which is formed by "a liquid crystal display panel" (claim 1, line 2) that receives light generated by "a surface light source device for inputting light to the liquid crystal display panel" (claim 1, line 3). The "liquid crystal display panel ...[is] provided with at least a liquid crystal cell and a polarization plate arranged at an input side of the liquid crystal cell" (claim 1, lines 4-5). For example, in the first embodiment illustrated in Figs. 1 and 2 of the application, liquid crystal display panel 1 includes a liquid crystal cell 13 and a polarization plate 14 disposed on the light input side 13a of the liquid crystal cell 13 (see page 6, lines 8-10).

Claim 1 further recites that the "surface light source device ... [is] provided with at least a light guide plate emitting light having a polarization state, a primary light source to supply illumination light to said light guide plate and a light control sheet interposed between said light guide plate and said polarization plate" (claim 1, lines 6-9). For example, in the first embodiment illustrated in Figs. 1 and 2, light generated by a cylindrical fluorescent lamp 6 is reflected by lamp reflector 7 and reflection sheet 10 to pass through prism sheet 12 which functions as a light control sheet to control and modify the direction of emission and direction of polarization of the light emitted from emission face 11 of light guide plate 4 prior to passing through polarization plate 14 to the light input side 13a of a liquid crystal cell 13 (see page 6, lines 2-10). As illustrated in Fig. 6 and described in the first five paragraphs on page 8 of the application, the light guide plate produces "[l]ight having a polarization state" (page 8, line 20).

Claim 1 further recites that the

> light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability acquired through the resin material drawing process and a cutting-out process for choosing the particular portion such that a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet

(claim 1, lines 10-15). For example, in the first embodiment illustrated in Figs. 1 and 2, the prism sheet (which functions as a light control sheet) is made by extruding polyethylene terephthalate (ET) from an extrusion machine and performing a two-axle drawing process to produce a sheet

with a predetermined width, then forming prismatic face 22 (see page 6, last 7 lines) and cutting to match the size of the emission face of the light guide plate 4. The drawing process produces varying polarization directions of emitted light, depending on which portion of the sheet is used (see page 8, line 20 to page 9, line 28 and Fig. 9). As described at page 12, line 14 to page 13, line 9, a portion (one of portions 12a through 12c in Fig. 8) of the sheet is selected to produce a screen with (near) maximum brightness (see Fig. 9).

Claim 2

Claim 2 is directed to a "surface light source device for inputting light to a liquid crystal display panel provided with at least a liquid crystal cell and a polarization plate arranged at an input side of the liquid crystal cell" (claim 2, lines 1-3) described, for example, for the first embodiment as "a surface light source device 2 arranged for illuminating" (page 5, line 26) a liquid crystal display panel 3 which includes "a liquid crystal cell 13 ... [and] a polarization plate 14" (page 6, lines 8-9).

Claim 2 recites that the surface light source device includes "at least a light guide plate emitting light having a polarization state" (claim 2, line 4). For example, in the first embodiment disclosed in the application, "the surface light source device 2 is provided with a light guide plate 4" (page 5, last 2 lines). As illustrated in Fig. 6 and described in the first five paragraphs on page 8 of the application, the light guide plate produces "[l]ight having a polarization state" (page 8, line 20).

Claim 2 also recites that the surface light source device includes "a primary light source to supply illumination light to the light guide plate" (claim 2, line 5). For example, in the first embodiment disclosed in the application, "the surface light source device 2 is provided with ... rod-like fluorescent lamp 6 ... [and] roughly-U-shaped lamp reflector 7" (page 5, line 26 to page 6, line 1) which together "compose a primary light source" (page 6, line 4) for the liquid crystal display panel.

Claim 2 also recites that the surface light source device includes "a light control sheet interposed between said light guide plate and said polarization plate" (claim 2, line 6). For example, in the first embodiment disclosed in the application, "prism sheet 12 functions as a light control sheet which controls and modifies direction of emission from an emission face 11 of the light guide plate 4" (page 6, lines 5-7) and, as illustrated in Fig. 4, the light emitted by light guide plate 4 passes through prism sheet 12 (which functions as a light control sheet), then through polarization plate 14 to the light input side 13a of liquid crystal cell 13 (see page 6, lines 2-10).

Claim 2 also recites that the

> light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability acquired through the resin material drawing process and a cutting-out process for choosing the particular portion such that a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet

(claim 2, last 6 lines). For example, in the first embodiment illustrated in Figs. 1 and 2, the prism sheet (which functions as a light control sheet) is made by extruding polyethylene terephthalate (ET) from an extrusion machine and performing a two-axle drawing process to produce a sheet with a predetermined width, then forming prismatic face 22 (see page 6, last 7 lines) and cutting to match the size of the emission face of the light guide plate 4. The drawing process produces varying polarization directions of emitted light, depending on which portion of the sheet is used (see page 8, line 20 to page 9, line 28 and Fig. 9). As described at page 12, line 14 to page 13, line 9, a portion (one of portions 12a through 12c in Fig. 8) of the sheet is selected to produce a screen with (near) maximum brightness (see Fig. 9).

Claim 3

Claim 3 is directed to a "light control sheet arranged for inputting light to a liquid crystal display panel provided with a least a liquid crystal cell and a polarization plate … arranged at an input side of the liquid crystal cell" (claim 3, lines 1-3). For example, in the first embodiment disclosed in the application, "prism sheet 12 functions as a light control sheet" (page 6, lines 567) and, as illustrated in Fig. 4, light emitted by light guide plate 4 passes through prism sheet 12, then through polarization plate 14 to the light input side 13a of liquid crystal cell 13 (see page 6, lines 2-10).

Claim 3 also recites that "the light control sheet … [is] applied to a surface light source device provided with at least a light guide plate emitting light having a polarization state and a primary light source to supply illumination light to the light guide plate" (claim 3, lines 3-6). For example, in the first embodiment disclosed in the application, "a surface light source device 2 arranged for illuminating" (page 5, line 26) liquid crystal display panel 3 "is provided with a light guide plate 4" (page 5, last 2 lines). As illustrated in Fig. 6 and described in the first five paragraphs on page 8 of the application, the light guide plate produces "[l]ight having a polarization state" (page 8, line 20).

Claim 3 also recites that the

> light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability that acquired through the resin material drawing process and a cutting-out process for choosing the particular portion a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet

(claim 3, last 6 lines). For example, in the first embodiment illustrated in Figs. 1 and 2, the prism sheet (which functions as a light control sheet) is made by extruding polyethylene terephthalate (ET) from an extrusion machine and performing a two-axle drawing process to produce a sheet with a predetermined width, then forming prismatic face 22 (see page 6, last 7 lines) and cutting to match the size of the emission face of the light guide plate 4. The drawing process produces varying polarization directions of emitted light, depending on which portion of the sheet is used (see page 8, line 20 to page 9, line 28 and Fig. 9). As described at page 12, line 14 to page 13, line 9, a portion (one of portions 12a through 12c in Fig. 8) of the sheet is selected to produce a screen with (near) maximum brightness (see Fig. 9).

VI. Grounds of Rejection to be Reviewed on Appeal

In the final Office Action dated December 13, 2006, the Examiner rejected claims 1-6 under the first and second paragraphs of 35 USC § 112 and under 35 USC § 102(b) as unpatentable over U.S. Patent 5,587,816 to Gunjima et al. At issue is whether Gunjima et al. discloses all of the limitations recited in the claims and whether the claims meet the requirements of the first and second paragraphs of 35 USC § 112.

VII. Argument

Rejections under 35 USC § 112

The rejections under the first and second paragraphs of 35 USC § 112 are a result of the Examiner's disbelief of the recitation in the claims, as supported by the specification, that the liquid crystal display recited in claim 1, the surface light source device recited in claim 2 and the light control sheet recited in claim 3 include "at least a light guide plate emitting light having a polarization state" (claim 1, lines 6-7 and claims 2 and 3, line 4). The Amendment filed October 5, 2006 explained that this characteristic of the light guide plate was supported by pages 7-8 and Figs. 5 and 6 of the application. The Response to Arguments section of the December 13, 2006 Office Action responded to this explanation by asserting that "[o]ne of ordinary skill in the art

would not be able to … find how light from lamp 6 can be polarized without go[ing] through any polarization element" (December 13, 2006 Office Action, page 5, lines 7-8).

It is submitted that the Examiner has provided no support for the position that a light guide plate is incapable of having the polarization effect described in the application. According to the specification, "light guide plate 4 is made of a light-permeable resin (such as polymethyl methacrylate) within which light scattering material such as silicone-type resin powder is dispersed uniformly" (application, page 6, lines 16-18). Pages 7-8 and Fig. 5 of the application clearly describe and illustrate a test that was performed on a light guide plate and the polarization effect that resulted is depicted in Fig. 6. It is understood by one of ordinary skill in the art that the light emitted from the emission face 11 (Fig. 5) of light guide plate 4 is inner-incident to the emission face at an incidence angle smaller than the critical angle (about 42° for polymethyl methacrylate (PMMA)) and that light inner-incident to the emission face at an incidence angle larger than the critical angle is not emitted from the light guide plate. Therefore, only a certain proportion of the inner-incident light can escape from the light guide plate. This proportion can be called the "escaping rate" and, as known in the art, the escaping rate has different values depending on the polarization component (P-polarization or S-polarization). Accordingly, even if the light inner-incident to the emission face of the light guide plate is completely non-polarized (i.e., 50% of P-polarization and 50% of S-polarization), the emitted light is not non-polarized (e.g., 60% of P-polarization and 40% of S-polarization). As a result, the light emitted from the emission face of the light guide plate 4 in the test illustrated in Fig. 5 is polarized to an extent that can be estimated by the eccentricity of the ellipse illustrated in Fig. 6.

The claims do not recite and the specification does not describe *polarized* light emitted from a fluorescent light, but rather that after being emitted by a fluorescent light and passing through a light guide plate, light is polarized to the extent illustrated in Fig. 6 of the application. No evidence has been cited by the Examiner contradicting these test results or the knowledge that one of ordinary skill would possess as discussed above. It is submitted that one of ordinary skill in the art would have no difficulty duplicating the test described on pages 7-8 of the application to confirm the polarization of light emitted by a light guide plate formed of PMMA would be as indicated by the test results illustrated in Fig. 6.

For the above reasons, withdrawal of the rejections under 35 USC § 112 is respectfully requested.

Rejections under 35 USC § 102(b)

In item 6 on pages 3-4 of the Office Action, claims 1-6 were rejected under 35 USC § 102(b) as anticipated by Gunjima et al. using the same words as in the April 6, 2006 Office Action. Furthermore, in the second subitem b of item 7 on page 5 of the December 13, 2006 Office Action in the Response to Arguments section, it was asserted that column 12, lines 41-45 of Gunjima et al. discloses that "the polarization plate 9, converts the light direction of the light having an angle of substantially 60° to the light ... having the direction perpendicular (90°) to the face of the LCD element (through the polarization [plate] 9)" (Office Action, page 5, lines 9-12); therefore, "the emitted light from the light guide plate would be rotate[d] around a light traveling direction (e.g., from 60° to 90°)" (Office Action, page 5, lines 12-13).

Due to the quality of the English quoted above from lines 9-12 on page 5 of the December 13, 2006 Office Action, Applicant cannot be entirely certain what the Examiner meant. As best the Applicant can determine, the statements quoted in the preceding paragraph (which also appeared in the April 6, 2006 Office Action) seem to suggest that due to **reflection** within prism array 7 as described at column 12, lines 31-45 of Gunjima et al., there is **rotation** of the polarization of the emitted light as recited in the independent claims, i.e., "polarization of the light emitted from said light guide plate is **rotated** around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet" (e.g., claim 1, last 3 lines, emphasis added). Applicant does not understand why the Examiner finds a logical connection between these two entirely different changes in direction. Furthermore, the last paragraph on page 4 of the December 13, 2006 Office Action (first subitem b of item 7 on page 4 of the Office Action) seems to assert that it is the "Applicant [who] confuses the function of 'reflection' within [the] prism array as described by Gunjima et al. and the 'rotation' of the polarization of the emitted light in the claimed invention" (December 13, 2006 Office Action, page 4, lines 12-14).

As discussed in the Request for Reconsideration filed June 8, 2004 and the Amendments filed August 5, 2004; May 3, 2005; January 19, 2006 and October 5, 2006, nothing has been found in column 12, lines 31-45 or anywhere else in Gunjima et al. suggesting that prism array 7, which causes reflection of light as illustrated in Fig. 1 of Gunjima et al., has any role in the polarization of the light emitted therefrom. As clearly apparent from the symbols defined in the legend at the bottom of Fig. 1 of Gunjima et al. and the description of polarized light separator 6 in column 11, lines 9-49, polarized light separator 6 causes light having a "polarization face perpendicular to plane" to be reflected within light guide 3 and permits light with an "in-plane

polarization face" to pass through polarized light separator 6 and reach prism array 7. There is no subsequent mention of any effect on the polarization of the light by either prism array 7 or light diffusing sheet 8. Nor is there any suggestion that polarized light separator 6 has any rotational effect on the polarization of the light passing therethrough. It merely acts as a polarized light filter, like that well known to anyone who has used polarized sunglasses.

Claims 1-6

Unlike Gunjima et al., as discussed above, the polarization effect of the light guide sheet recited in claims 1-3 is fully described in the specification. In addition, the independent claims recite that the light emitted by the light guide plate has "a polarization state" (e.g., claim 1, line 7). All that is disclosed in Gunjima et al. is that prism array 7 **reflects** light which is then polarized by polarized light separator 6. As a result, there is no suggestion in Gunjima et al. that by transmission through the polarized light separator "a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate" (e.g., claim 1, last 3 lines), because no description has been cited or found in Gunjima et al. regarding how light emitted by the prism array 7 is polarized or that the light emitted by the polarized light separator is aligned with "a direction of a light transmission axis of said polarization plate" (e.g., claim 1, last 2 lines).

The Examiner apparently has confused rotation of "maximum-intensity-direction of polarization of the light emitted from said light guide plate ... around a traveling direction of the light" (e.g., claim 1, lines 13-14) with redirection of the traveling direction of light emitted from the emission face of a light guide plate. In Fig. 5 of the application, an example of the traveling direction of the light is depicted by reference numeral 23. The directional arc corresponding to reference character "D" in Fig. 5 represents the rotation of the maximum-intensity-direction of polarization of the light. Pages 10-12 of the application describe the rotation of the maximum-intensity-direction of polarization of the light from 0°—180° in Fig. 6 to 155°—355° in Fig. 10 and between 10°—190° to 20°—200° in Fig. 11.

It is submitted that column 12, lines 41-45 of Gunjima et al. merely describes redirecting the traveling direction by the use of prism array 7 as illustrated in Fig. 1 of Gunjima et al. Even if it is assumed that prism array 7 corresponds to the light guide plate recited in claims 1-3, nothing has been cited or found in Gunjima et al. suggesting that the "maximum-intensity-direction of polarization of the light emitted from said light guide plate [i.e., prism array 7] is rotated around a traveling direction of the light" (e.g., claim 1, lines 13-14). Regardless of whether the light control sheet recited in claims 1-3 also redirects the light in the manner of the prism array 7 disclosed by

Gunjima et al., nothing has been cited in Gunjima et al. suggesting the additional feature of rotating the "maximum-intensity-direction of polarization of the light emitted from said light guide plate" as recited in claims 1-3.

For the above reasons, it is submitted that claims 1-3 and claims 4-6 which depend therefrom patentably distinguish over Gunjima et al.

Summary of Arguments

For the above reasons, it is submitted that claims 1-3 and claims 4-6 which depend therefrom patentably distinguish over Gunjima et al. Thus, it is respectfully submitted that the Examiner's final rejection of the claims is without support and, therefore, erroneous. Accordingly, the Board of Patent Appeals and Interferences is respectfully urged to so find and to reverse the Examiner's final rejection.

Please charge the required fee in the amount of $510.00 to our Deposit Account No. 19-3935. If any additional fees are required, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: October 1, 2007

By: */Richard A. Gollhofer/*
Richard A. Gollhofer
Registration No. 31,106

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

VIII. Claims Appendix

1. A liquid crystal display comprising:

a liquid crystal display panel; and

a surface light source device for inputting light to the liquid crystal display panel,

said liquid crystal display panel being provided with at least a liquid crystal cell and a polarization plate arranged at an input side of the liquid crystal cell,

said surface light source device being provided with at least a light guide plate emitting light having a polarization state, a primary light source to supply illumination light to said light guide plate and a light control sheet interposed between said light guide plate and said polarization plate,

wherein said light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability acquired through the resin material drawing process and a cutting-out process for choosing the particular portion such that a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet.

2. A surface light source device for inputting light to a liquid crystal display panel provided with at least a liquid crystal cell and a polarization plate arranged at an input side of the liquid crystal cell, comprising:

at least a light guide plate emitting light having a polarization state;

a primary light source to supply illumination light to the light guide plate; and

a light control sheet interposed between said light guide plate and said polarization plate,

wherein said light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability acquired through the resin material drawing process and a cutting-out process for choosing the particular portion such that a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet.

3. A light control sheet arranged for inputting light to a liquid crystal display panel provided with a least a liquid crystal cell and a polarization plate which is arranged at an input side of the liquid crystal cell, the light control sheet being applied to a surface light source device provided with at least a light guide plate emitting light having a polarization state and a primary light source to supply illumination light to the light guide plate,

wherein said light control sheet is made of a particular portion of a resin material produced through a resin material drawing process and is provided with an ability that acquired through the resin material drawing process and a cutting-out process for choosing the particular portion a maximum-intensity-direction of polarization of the light emitted from said light guide plate is rotated around a traveling direction of the light toward a direction of a light transmission axis of said polarization plate by transmitting through the light control sheet.

4. A light control sheet as recited in claim 3, wherein said light control sheet is a prism sheet disposed next to said polarization plate.

5. A surface light source device as recited in claim 2, wherein said light control sheet is a prism sheet disposed next to said polarization plate.

6. A liquid crystal display as recited in claim 1, wherein said light control sheet is a prism sheet disposed next to said polarization plate.

IX. Evidence Appendix

(None)

X. Related Proceedings Appendix

(None)